

One Health Approach to Address Zoonotic Diseases

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Abstract

The world of animals, humans, and environment is interlinked, giving rise to a number of benefits as well as a spread in zoonosis and multifactorial chronic diseases. With the emergence of antimicrobial resistances and environmental pollution, addressing these diseases needs an interdisciplinary and intersectoral expertise. “One Health (OH)” refers to such collaboration between local, national, and global experts from public health, health care, forestry, veterinary, environmental, and other related disciplines to bring about optimal health for humans, animals, and environment. The concept of OH is still in embryonic stage in India and increasingly gaining importance. The Government of India has taken some initiatives to tackle burgeoning problems such as antimicrobial resistance, zoonotic diseases, and food safety using the OH approach, but there are several challenges at the level of implementation. The major bottlenecks in implementing OH include absence of a legal framework to implement OH, poor coordination among different governmental and private agencies, lack of proper surveillance of animal diseases, poor data-sharing mechanism across sectors, and limited budget. Implementing systematic zoonotic surveillance; regulated antibiotic use among humans and animals; development of a zoonotic registry in the country; constitution of a wide network of academic, research, pharmaceutical, and various implementation stakeholders from different sectors is the need of the hour to effectively use OH in order to combat increasing zoonotic diseases.

Keywords: Animal health, antimicrobial resistances, chronic diseases, One Health, zoonosis

INTRODUCTION

One Health (OH) is a collaborative, multisectoral, coordinated, and transdisciplinary approach – working at the local, regional, national, and global levels – with the goal of achieving optimal health outcomes by recognizing the interconnection between people, animals, plants, and their shared environment.^[1] With the increase in population, industrialization, and geopolitical problems, global changes are accelerating which damage the biodiversity, ecosystems, and migratory movements of both humankind and species in general. Rapid climate and environmental changes have led to the emergence and reemergence of infectious and noninfectious diseases [Figure 1].

Zoonotic diseases are the infections that are transmitted between animals and humans and are a major source of emerging infectious diseases. Nearly >60% of the pathogens that infect humans cause zoonotic diseases in humans. The highest zoonotic disease burden, with widespread illness and death, is prevalent in Ethiopia, Nigeria, Tanzania, and India.^[2] According to a study carried out by the International Livestock

Research India, 13 zoonoses are the cause of 2.4 billion cases of human diseases and 2.2 million deaths per year.^[2]

The OH approach is increasingly gaining attention as the standard approach globally to combat the emerging infectious diseases and zoonotic threats such as SARS or Ebola.^[3] For the success of OH, intersectoral collaboration and various actors of complex health system involved should be operationalized. The approach should be able to adapt to the local needs and the existing constraints of the health system, employing them at the same time by enabling various stakeholders to collaborate without difficulties.

ONE HEALTH STATUS IN INDIA

In the Indian context, the OH approach is strategically gaining importance from all stakeholders such as public

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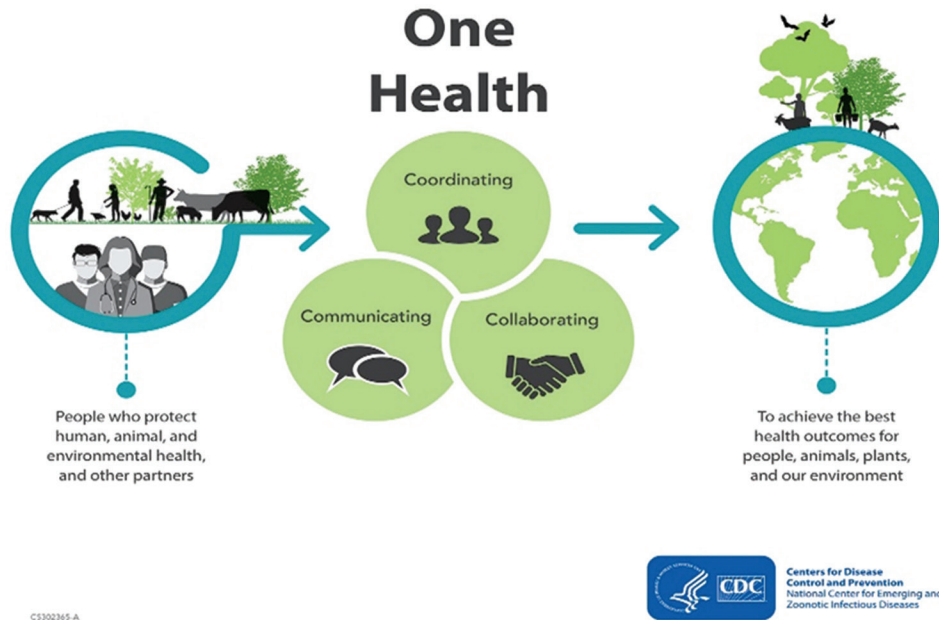


Figure 1: One Health Approach. Source: CDC^[1]

health professionals, veterinarians, health-care providers, policymakers, and researchers. While animal-to-human transmission is a major threat in the country with several diseases such as avian flu, rabies, a major growing threat is from bovine tuberculosis which is on the increase. In addition, emerging zoonotic diseases are acquired through wild animals, and the OH approach should look into the wild zoonotic diseases also. The successful implementation of the OH model involves integration and collaboration between multiple sectors of agriculture, animal health, and human health.^[4]

Although the OH approach is in an embryonic stage in India, there are many crosscutting policies and regulatory measures that are operating and conducive for further development of the approach. Owing to the public health importance of zoonotic diseases in India, a National Standing Committee on Zoonoses was formed in 2007.^[5] The Food Safety and Standard Act,^[6] India, stipulates the limits for contaminants, naturally occurring toxic materials, antibiotic residues, pesticides, heavy metals, veterinary drug residues, etc., Government-initiated control programs for zoonotic and highly communicable diseases such as rabies, brucellosis, and food-and-mouth disease are available.^[7] The Centre of Zoonosis, National Centre for Disease Control, India, has published a manual for handling zoonotic diseases.^[8] Trade policies exist that affect Indian agricultural practices to maintain stringent quality measures according to the international standards. There is "Make in India" initiative which supports the development of medical equipment, drug, vaccines, and technology innovations^[9] that can be used to address zoonotic diseases. There are pilot initiatives on the development of protocol for the Database of Zoonotic Disease Research in India.^[9] A process of consultation has been initiated regarding

an appropriate organizational structure for an OH hub in India to support intersectoral activities involving both the human and animal health sectors, working with government engagement on OH initiatives.^[10]

In spite of the initiatives, there are still challenges related to adopting OH approach in the country for zoonosis. With increasing population, a large number of people are in contact with pet and farming animals, making the country a hotspot for emerging zoonotic diseases. While there is an increased focus on the prevention and prediction of diseases in human health other than diagnosis, treatment, and rehabilitation, the animal health sector lacks proper surveillance and reporting of animal diseases and laboratory diagnosis. Another major challenge is setting up surveillance programs, and there is lack of support from partners. Milder zoonotic diseases that pose low and medium risk which when not addressed can convert into major problem are not monitored. There is a lack of awareness. Wild zoonosis is a domain which lacks proper attention. One main challenge is that the collaboration and coordination among the stakeholders is not sufficient to adopt a standard OH protocol.

WAY FORWARD

Surveillance of animal health should be strictly ensured. It is crucial to track the globally emerging new outbreaks. There should be strong interdisciplinary network of partners to improve surveillance and monitoring. The awareness of farmers, livestock managers, and environmentalists should be increased regarding the OH approach and zoonotic diseases. A national disease registry of zoonotic diseases needs to be developed. Increased use of technology to improve the living environment of animals and monitoring and treatment of diseases should be motivated. Prevention through increased

vaccination coverage should be targeted. Based on the learning from the use of OH approach to combat zoonotic diseases globally, best practices need to be developed and adopted.

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Conflicts of interest

There are no conflicts of interest.

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